

STEM at Spelman: Shining Stars for Tomorrow's Needs

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STEM at Spelman: Shining Stars for Tomorrow's Needs

- History of STEM at Spelman College
- Significance of STEM success at Spelman
- Institutional Context
- Strategic Initiatives
- Planning for the Future: Role of HBCUs in preparing future scientists

History of STEM at Spelman College



- Biology and Mathematics Departments established prior to 1950
- Chemistry Department established in 1976
- Computer and Information Sciences: 1992
- Physics Department: 2001

Albro-Falconer-Manley Science Center

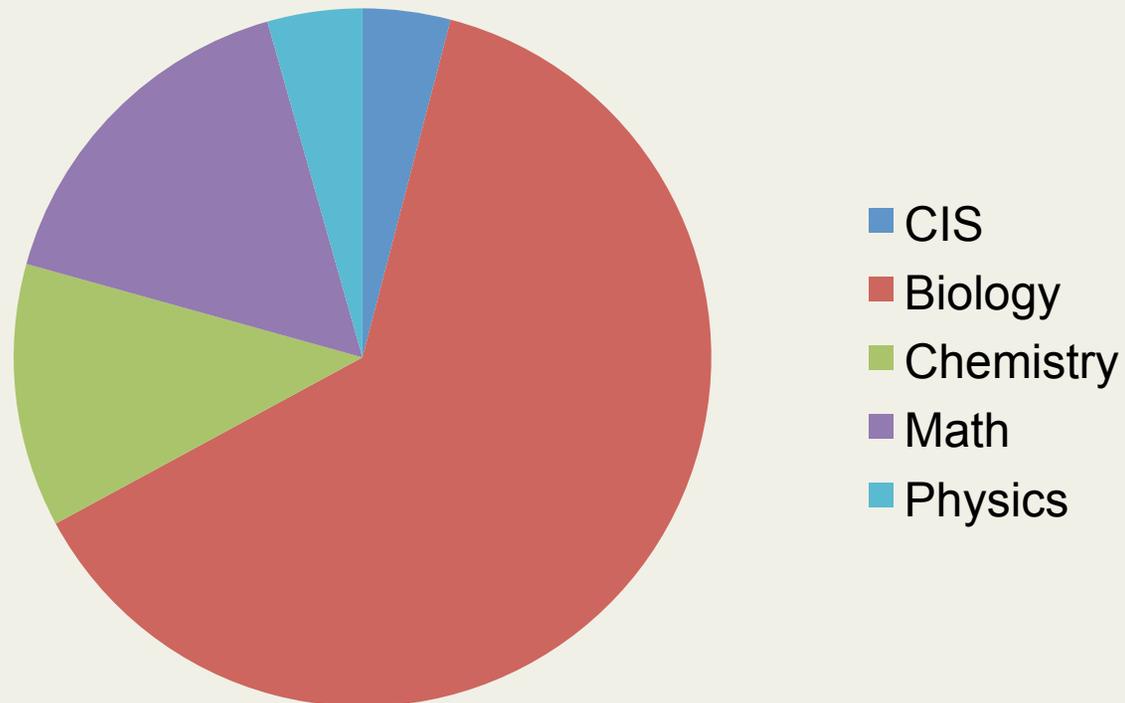


STEM Majors at Spelman College

- Total College enrollment = 2150
- STEM majors account for 30% of all majors
- Majority of these majors are in Biology
- One third of all graduates are STEM majors

STEM Majors, 2008-09

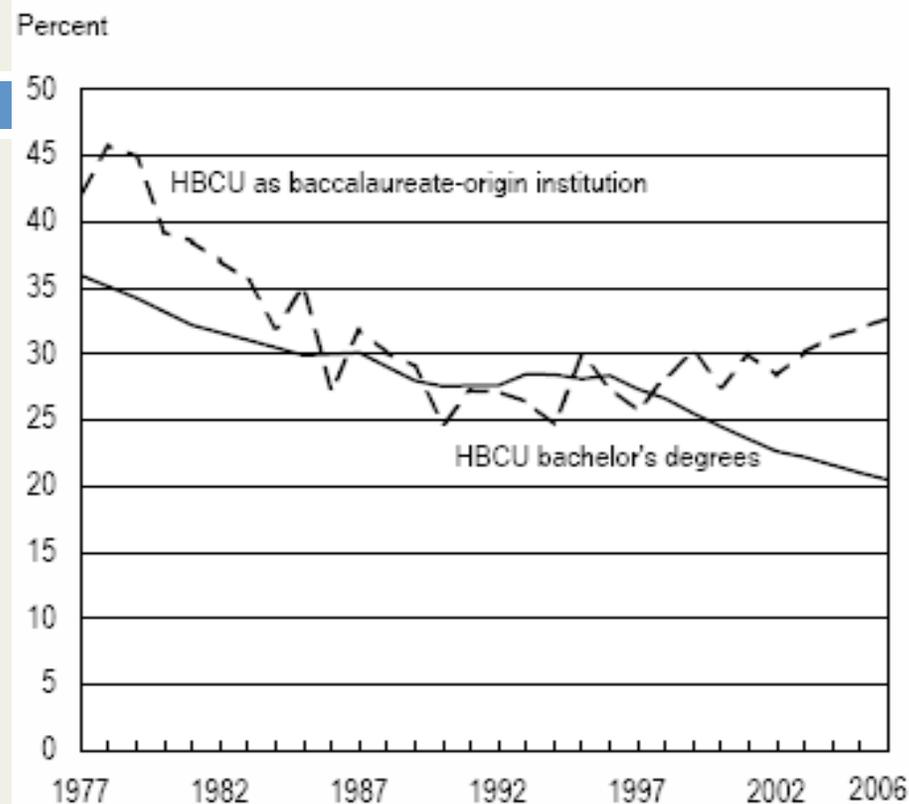
STEM Majors, 2008-09



Spelman's Role in Producing African American PhDs in STEM

- Ranked by NSF in 2008 as the #2 undergraduate institution of origin of Black PhDs in STEM
- In 2006, 29.3% of all Black PhDs in STEMs earned their bachelors at HBCUs
 - This represents 10.1 Black PhDs per 1,000 bachelors
 - For non-HBCUs, 7.9 Black PhDs per 1,000 bachelors

FIGURE 1. Black S&E doctorate recipients with HBCU baccalaureate degrees and black bachelor's degrees conferred by HBCU institutions: 1977–2006

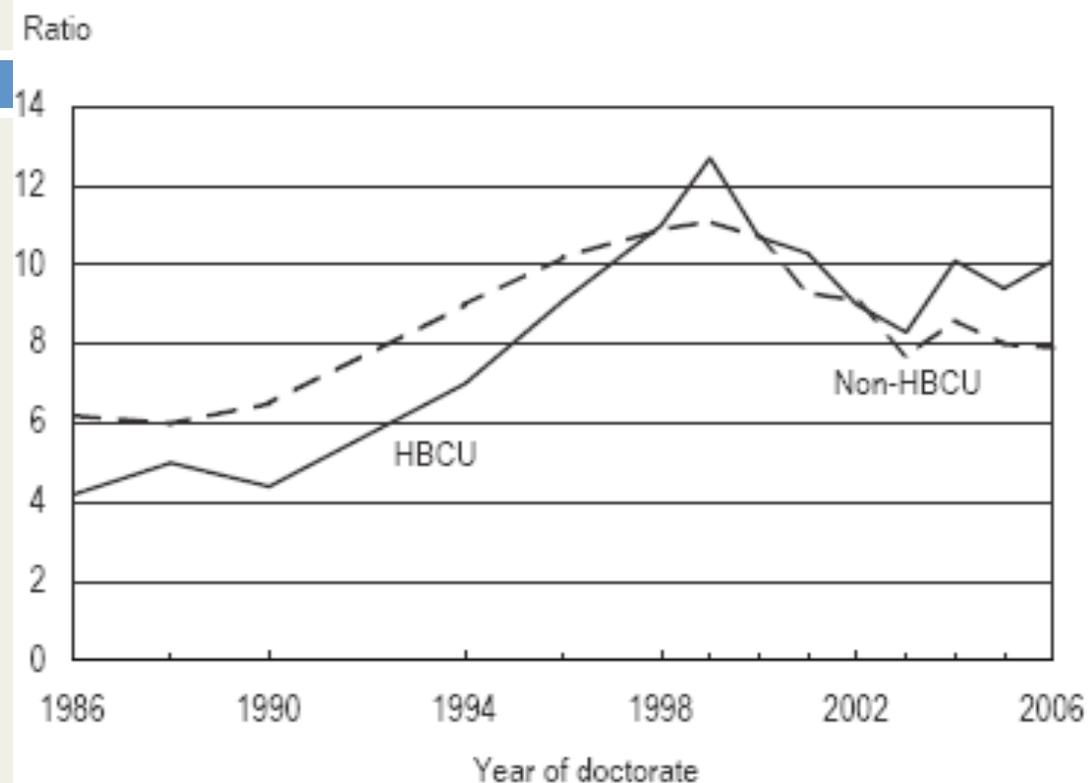


HBCU = historically black college or university.

NOTES: Includes only U.S. citizens and permanent residents. Bachelor's degree data by race are not available for 1978, 1980, 1982–84, 1986, 1988, and 1999.

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Earned Doctorates, 1977–2006 and National Center for Education Statistics, IPEDs Completions Survey, 1977–2006.

FIGURE 2. Black S&E doctorate recipients per thousand black bachelor's degrees awarded in all fields 9 years earlier, by HBCU and non-HBCU institutions: Selected years, 1986–2006

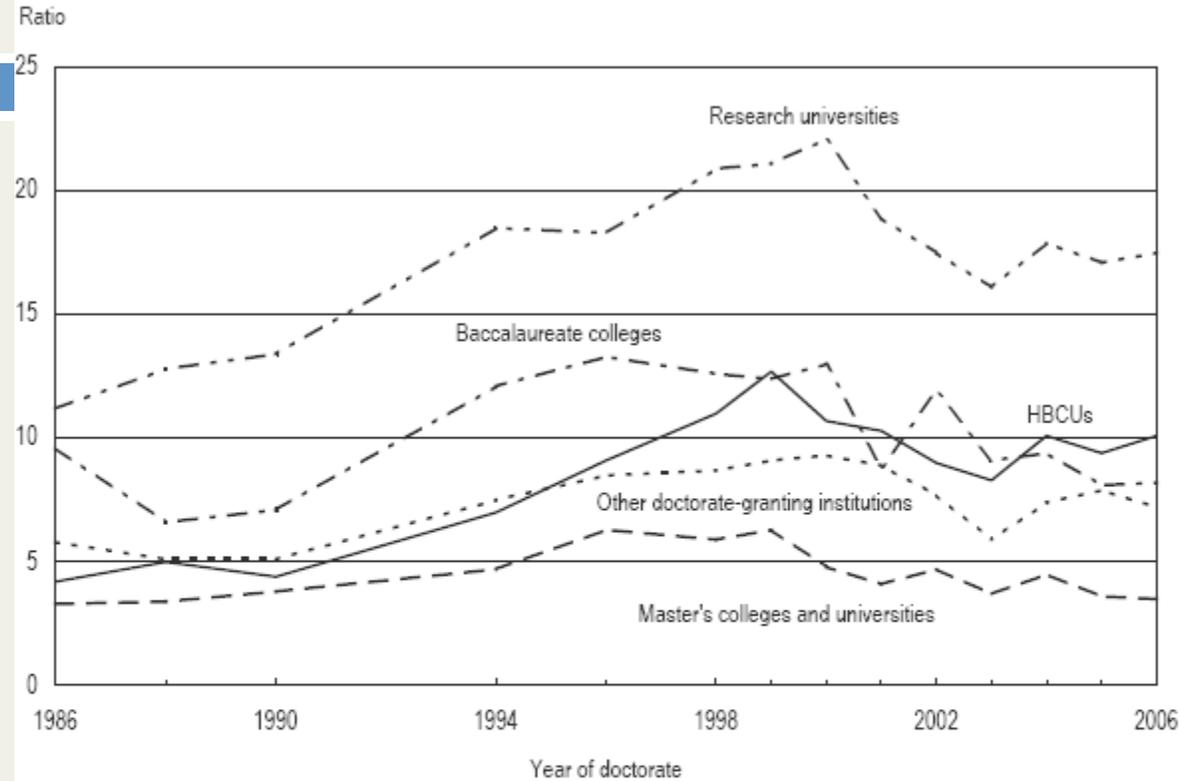


HBCU = historically black college or university.

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SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Earned Doctorates, 1977–2006 and National Center for Education Statistics, IPEDs Completions Survey, 1977–1997.

FIGURE 3. Black S&E doctorate recipients per thousand black bachelor's degrees awarded in all fields 9 years earlier, by selected Carnegie group and HBCU status: Selected years, 1986–2006



HBCU = historically black college or university.

NOTES: Includes only U.S. citizens and permanent residents. Research universities are the Carnegie group "doctorate granting universities-very high research activity." Other doctorate-granting institutions include doctorate granting institutions, high research activity and doctoral/research universities. Bachelor's degree data by race were not collected in 1978, 1980, 1982–84, 1986, and 1988.

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Earned Doctorates, 1986–2006 and National Center for Education Statistics, IPEDs Completions Survey, 1977–1997.

Top 10 bac. origin institutions: 1997-2006 Black STEM PhDs

- 1. Howard University
- 2. Spelman College
- 3. Hampton University
- 4. Florida A & M University
- 5. Morehouse College
- 6. North Carolina A & T University
- 7. Southern University A & M College – Baton Rouge
- 8. Xavier University
- 9. Harvard University
- 10. University of Maryland at College Park

□ Source: NSF, Division of Science Resources Statistics, Survey of Earned Doctorates and National Ctr. For Education Statistics, IPEDs Completion Survey, 1977-2006

How did Spelman accomplish this?

▣ Institutional Vision

- Leadership of Dr. Etta Falconer and Dr. Shirley McBay
- Collaboration of faculty and administrators

▣ Strategic Planning and Implementation

- Intentional development and growth of the sciences
- Increasing majors in the sciences and mathematics

▣ Resources

- External funding
- Partnerships and collaborations

Spelman College, 1971

- 10% of all majors were in the sciences
- 9% of degrees awarded were in the sciences
- Small enrollments in sciences courses beyond the first year level
- Biology and Mathematics were the only departments with majors
- “The science building was dark and uninviting” (Falconer, 1989)

Strategic Planning and Implementation

- Concerted initiatives to increase majors
- Pre-freshman summer programs - recruiting efforts
 - Biomedical/Health focus
 - Mathematics/CIS/Physical sciences and engineering focus
- Establishment of Health Careers Office
- Office of Science, Engineering, and Technical Careers
- Supplemental instruction and “early warning system,” Math Lab

Cultivating Resources

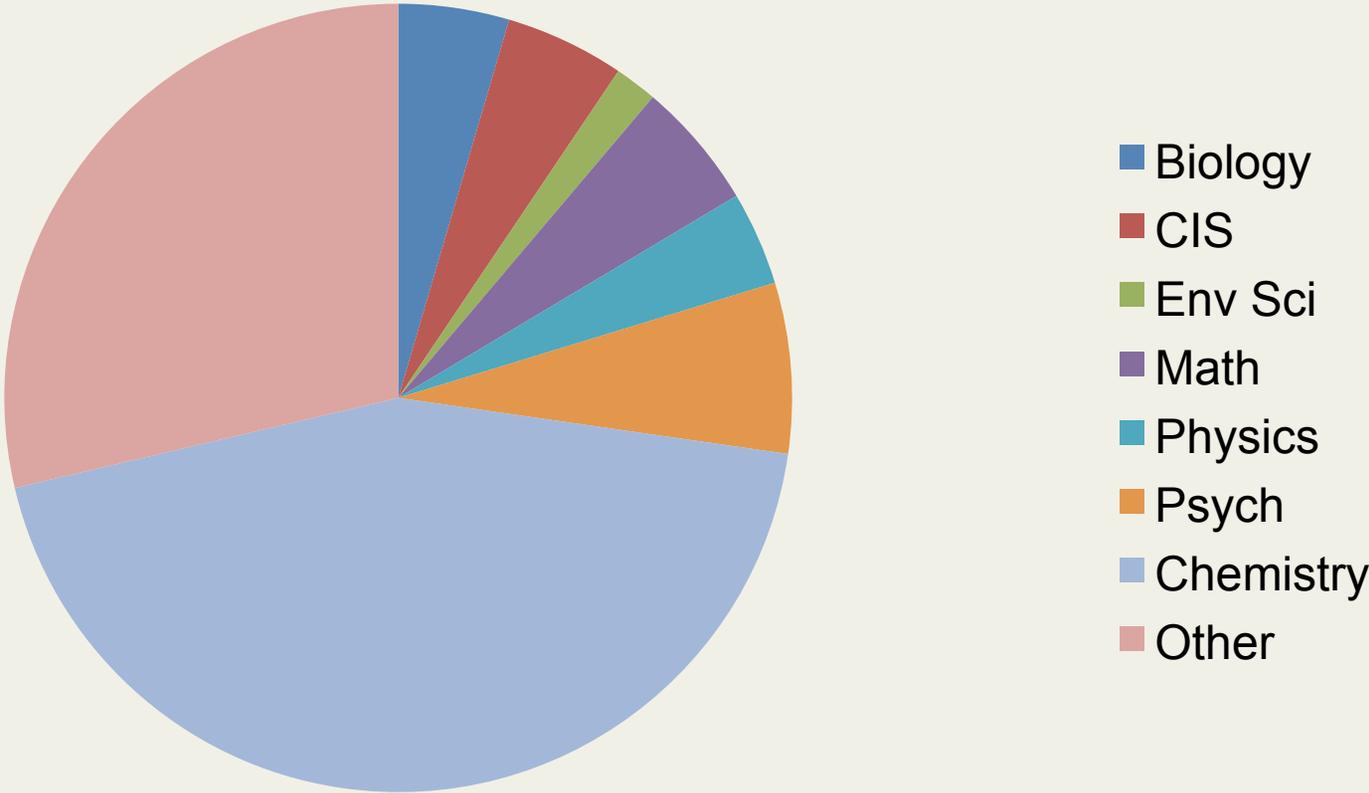
- NASA: Women in Science and Engineering (WISE)
- NASA: Model Institutions of Excellence
- NIH/NCMHD: Research Infrastructure in Minority Institutions (RIMI)
- NIH/MORE: MBRS-RISE, MARC-U STAR
- NIH/MORE: SCORE
- Howard Hughes Medical Institute

Cultivating Resources

- 2001: Albro-Falconer-Manley Science Center opened
- Collaborations: Georgia Tech, Emory, Georgia State
- Atlanta University Center: Morehouse, Clark Atlanta University, Morehouse School of Medicine
- MOUs: Environmental Protection Agency, Princeton University, Department of Transportation

STEM Research and Training Funding

\$ 31.3 billion



Creating an Environment for Excellence

- “Departmental Culture” (Whitten et al., 2007)
 - ▣ Culture is “inclusive of women, students of color, and others”
 - ▣ Tutorial programs (students as tutors)
 - ▣ Seminar speakers
 - ▣ Connections with alumnae/mentors
 - ▣ Informal social activities
 - ▣ Connections among students in the major

Promoting an Environment of Excellence

- High faculty expectations of student success in the sciences and mathematics
- Small class sizes, 11:1
- Focus on undergraduate research
 - ▣ Availability of several research training programs
 - ▣ Atlanta Univ. Consortium, Ga Tech, Emory, GSU
- Many African American and African American women role models and mentors
- High drive of students

STEM Culture at Spelman College

- Strong cohort of students in sciences and math
 - ▣ Math, Physics, Chemistry, Biology, CIS clubs, student Environmental Task Force
- SpelBots: competed in three RoboCups; only undergraduate, women, HBCU team to ever qualify
- WISE Scholars, Xerox Scholars, Boeing Scholars
- College-wide annual Research Day
- Support for student travel to research conferences
- Dual Degree in Engineering Program
- STEM represents 95% of all external funding

Culture of Academic Excellence

- Spelman's mission as the leading HBCU for women of African descent
- Distinctiveness of a woman's college
- Unique features of a liberal arts college
- Connections among academic excellence and service learning/leadership/community outreach

New Initiatives

- G-STEM: “Enhancing Global Research and Education in STEM at Spelman College;” proposal under review at NSF
- Quality Enhancement Plan for SACS Reaffirmation:
 - “Internationalizing the Curriculum”
- Massie Chair in Physics, “The Enhancement of Research, Environmental Management and Science Curriculum,” Department of Energy

Preparing Tomorrow's Scientists

- Interdisciplinary, collaborative perspectives and experiences
 - ▣ ASPIRE Project
 - ▣ ARTSI Project
 - ▣ Health Disparities Scholars
- Interdisciplinary Curricular collaborations
- Global Experiences
- Teamwork and mentoring

Building on Success for the Future

